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Evaluating Pasture Management with Grazing Livestock

U.S. Dairy Forage Research Center

Introduction

A quarter century ago, scientists in Wisconsin recognized the need for comparing cool-season grass varieties that were being developed by imposing defoliation with grazing livestock (Casler et al., 1998). Scientists observed that cool-season grass breeders (consciously or unconsciously) had released varieties better adapted to hay or silage management because of the infrequent harvest schedules and mechanical harvest equipment typically used in breeding programs. Within this context, these scientists identified unique pressures on grazed pasture plants that included:

- defoliation of plant tissue, which may be less uniform or controlled than mechanical harvests
- selective defoliation of plant parts or plant species
- trampling by livestock
- excretion of feces and urine

Acclimation/Required Grazing Experience

A related issue affecting the credibility of research results (from the perspective of graziers) involves the selection of animals and the previous grazing experience of livestock used in grazing experiments. Because of the land-area requirements and overall expense involved, most research facilities can't maintain both confinement-based and dedicated grazing-based dairy herds. A grazing-based dairy herd also would likely require a substantially different genetic background. As a result, research efforts are often criticized by graziers whenever confinement-based cows or heifers are used in grazing trials.

Experimental Approach

An on-farm experiment was conducted in southern Wisconsin, where 56 varieties of cool-season grasses characterized as moderately winter

Forage intake drives animal production, so determining differences in intake rates between forage species is crucial information to provide to pasture managers.

hardy with vigorous regrowth were established in replicated plots on three dairy farms. Forage species and the number of varieties in the trial included orchardgrass (18), tall fescue (15), meadow fescue (7), perennial ryegrass (10), intermediate ryegrass (2), Italian ryegrass (2), festulolium (1), and Matua prairie brome (1).

Pastures were defoliated by lactating dairy cows to a 4 to 6-inch residual height. They were then allowed to recover to an 8- to 12-inch height (20 to 40 days of rest) before the next grazing event. No fertilizer, pesticides, or manure were applied. Weeds were controlled solely by grazing, but alfalfa was overseeded into half of the field replications at a seeding rate of 10 lbs/acre. Figure 1 illustrates the linear relationships between apparent intake and available forage for orchardgrass, tall fescue, ryegrass, and meadow fescue based on responses for individual varieties within each species.

Synthesis Comments

These grazing-based data indicated that apparent intake was always positively related to available forage, and that relationships were relatively strong among varieties within each species, but quite variable across species. For example, orchardgrass varieties always exhibited greater apparent intake (less refusal) than tall fescue at comparable amounts of available forage. Ryegrass varieties exhibited a similar relationship with meadow fescue varieties. Although tall fescue varieties always produced more available forage than meadow fescue, their overlap in apparent intake suggested a possible greater palatability for meadow fescue, and potential for selective grazing within mixed species pastures.

Another important aspect of this trial involved assessment of ground cover as an indicator of persistence. Italian ryegrass, intermediate ryegrass, festulolium, and Matua prairie brome did not respond well to the imposed management intensive grazing and/or relatively harsh, but largely snow-free winters. They suffered considerable stand loss resulting in only 18 to 64% ground cover. These entries were deemed unsuitable for the combination of grazing and environmental stresses imposed in the trial. All other varieties, regardless of species, exhibited greater than 70% ground cover that did not affect available forage measurements. Perhaps most importantly, this research effort acknowledged potential pitfalls associated with varietal development of grasses for grazing applications based on the mechanized harvest regimes used traditionally. The study also began to establish credibility with graziers because research protocols and results were specific to their needs.

References

Casler, M.D., D.J. Undersander, C. Fredericks, D.K. Combs, and J.D. Reed. 1998. An on-farm test of perennial forage grass varieties under management intensive grazing. J. Prod. Agric. 11:92-99

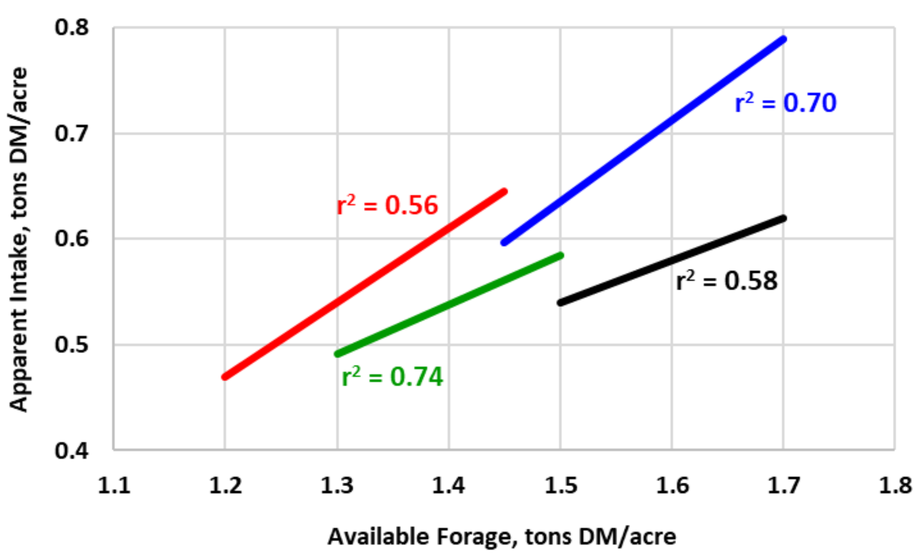

Figure 1. Linear relationships between apparent intake and available forage for orchardgrass (---), ryegrass (---), tall fescue (---), and meadow fescue (---) based on varietal means within each species obtained from three farms over two years. Variability around the linear relationships is indicated by r2 statistics, where a greater number represents less variability (maximum or perfect agreement = 1.0) [adapted from Casler et al. (1998)].